

Navigation Improv'd :

Or, the ART of

Rowing S H I P S

Of all Rates, in CALMS,

With a more easy, swift, and steady Motion,
than O A R S can.

A L S O,

A Description of the ENGINE
that performs it ;

And the Author's A N S W E R to all Mr. *Dummer's*
OBJECTIONS that have been made against it.

Magna est Veritas & Prævalebit.

By *Tho. Savery*, Gent.

L O N D O N,

Printed and Sold by *James Moxon*, at the *Atlas*
in *Warwick-Lane*, 1698.

Navigation improved :

OF THE ART OF

Rowing SHIPS

OF all RACES, in CALMS,

With a more easy, swift, and steady Motion,
than OARS can

ALSO

A Description of the ENGINE
that performs it :

And the Author's ANSWER to all Mr. Dummer's
OBJECTIONS that have been made against it.

Magna est Veritas & Prevalebunt.

By Tho. Savery, Gent.

LONDON,

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THE
DEDICATION

To all the
Masters of the Art

NAVIGATION.

Gentlemen,
THE chief Strength and Se-
curity of the Nation as
well as the Wealth and
Riches of it, depending under
God, and our good King, on your
Integrity, Courage and Conduct;

The Dedication.

I have no reason to suspect Men of your Honesty and Bravery, will suffer your Judgments to be by-afs'd or prejudiced against me, in favour of my Adversaries, who I think, without much ground, opposed the making my *ENGINE* useful to the *NAVY* of *ENGLAND*, as I design'd it; for no other reason that I know of, than that it is not their own Contrivance: And therefore, as an *English* Man, and a Lover of my Country, I humbly submit the Justice of my Cause, and what I here say in my Defence, to your Judgment and Candor; and am

Your humble Servant,

T. S.

T O T H E

R E A D E R.

K Ind Reader, if you give your self the trouble to look into this small Treatise, pray read it through, and you will find my Reputation being concern'd, (a thing upon which my Welfare doth depend;) I am necessitated to write it. For after I had troubled my Thoughts and rack'd my Brains, to find out that which a great many have spent several years in vain in the pursuit of, when I had brought it to a Draught on Paper, and found it approved by those commonly reputed Ingenious, and receiving Applause, with promises of great Reward from Court, if the thing would answer the end for which I propos'd it: after I had with great Charge and several Experiments, brought it to do beyond what I ever promis'd or expected my self, at last one Man's Humour, and no more than a Humour, totally obstructed the use of my ENGINE, to the great Disservice of both
King

The Preface.

King and Country, and my no small loss. But it's the nature of some Men to decry all Inventions, how serviceable soever to the Publick, that are not the Product of their own Brains. I hope therefore you will think me excusable, if I endeavour to satisfy the World, that I do understand something of the Business I pretend to; and if by the means of it Mankind receives any Advantage, I shall think myself very happy, for the promoting the common good of every body, hath always been my chief Delight; and certainly, nothing contributes more to it than the Improvements made by the Mechanicks: for that Noble Machine called a SHIP, is no more than a Mechanick ENGINE; which from the time of its first Invention, has admitted of such Improvements, that its use is now prodigious. 'Tis Ships are our best Defence against our Enemies, and 'tis Ships bring us in the Wealth of our Friends. The Grist-Mill which finds us Bread, is a Mechanick Engine also.

The Spinning-Wheel, Loom, and Fulling-Mill, which cloath us: The Paper Mill and Printing Press, which have their Uses too; with some others that I could name, are all the Products of the Mechanicks. And indeed, there are few Benefits we enjoy, if reasonably considered, but are the Product of Project, or the Invention of the Industrious, whom the Ancients Adored, and Deified, as the Authors of their Happiness, when they contrived any thing that was for the publick good. Thus Ceres was made a Goddess, for teaching the People the way to Plough and make Bread; and Bacchus was made a God, for informing the World how to make Wine. History is full of instances of this kind, and of the various Honours they did their Benefactors; but this
alas!

The Preface.

alas ! at present, is so much neglected and despised in our Country, and so little encouragement given to the Ingenious, that 'tis to be feared, Arts will decay, and be quite lost in time, in England ; which will as certainly bring Poverty, as Clouds and dark Weather bring Rain. For all Countries, as they have either lost their Arts, which many have done ; or whose Countries which have been always ignorant, at this day remain poor and impotent through the whole Universe. It is a great deal of pity that this should be our case ; and I believe, for so small a space and tract of Land as our Island contains, no Country in the World abounds with Men of more ingenious Spirits than we do : But I am sorry to say it of so Heroick a People, That in some things they are very effeminate ; there being few to be found that will any more speak well or approve of what another has done, tho' never so deserving, than any Female will allow another of her Sex to pass for a Beauty ; because 'tis not in the nature of Women to see, or acknowledge good Features in any bodies Face but their own. And this on my conscience, is my case ; for I can never persuade my self, that any Man, tho' but of common Understanding, can satisfy himself with such weak Objections, as you will find ~~noted against~~ my ENGINE ; and more than suspect, there is something of this sordid barbarous temper in it. But after all, Courteous Reader, I shall court you to no Partiality on my side, but leave you at your liberty, to judge of me and my performance, as in justice you shall think fit, or as you would have another judge of you, or any Invention of yours, or if it were your own case ; for my part, all that I desire, is, That the World would act Honestly, and upon the Square with me ; and
that

The Pretace.

that the Gentleman with whom I am concern'd, would give me some better Arguments to overthrow the Use of my ENGINE, than hitherto have been produced. 'Tis not my fondness of own Bratt, only makes me think so, but the Opinion of several very judicious Persons here in Town, confirm me in my Notion, That the Objections are really no Objections at all; and 'tis the judgment of others more than any conceit of my own, which encouraged me to stand a Publick Tryal, which nothing else could have given me confidence enough to do.

Navigation

Navigation Improv'd, &c.

ABOUT *March* 94. I considering with my self how much it was every Man's Duty to assist his King and Country, to the utmost of his Power, according to his Genius, especially in a time of War. I grew very uneasy, till such time as Providence had directed me in this Matter. After I had employ'd my Thoughts some time, I concluded that the chief Strength of *England* lay in the Fleet, and that could we make any Improvement on Shipping, so as to give them Motion, when the Enemy could give theirs none; as in Calms, which generally happen in Fights, and at other times very often in the *Summer*, if such Discovery could be made before the Enemy, the use of it would be very Extraordinary. Upon which I nicely considered the Nature of *Oars*, after which I contrived an *Engine* more useful, and applicable to *Ships*. Which *Engine* and *Oar*, are thus compar'd to each other.

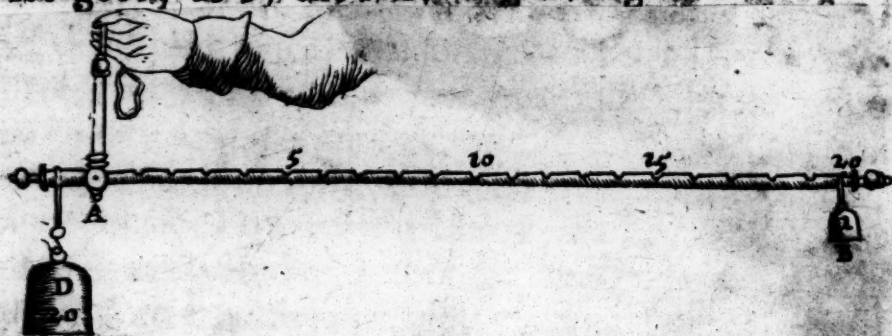
The Figure of an Oar for a Ship.



B

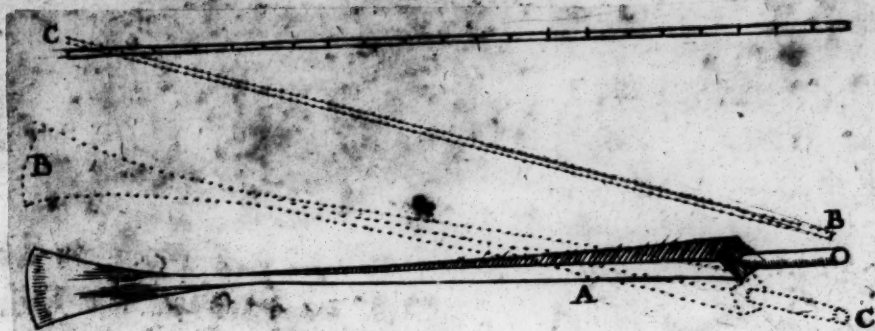
Now

Now suppose the *Oar* at A on the side of the Ship B being in a Man's Hand, and C to take hold of the Water: From B to A is but half as long as from A to C; so that when the *Oar* is mov'd at B, it moveth twice as far at C at the same time; tho' but with half the Strength: for one Man at C would pull as much as two at B, so that the *Oar* is nothing more than the *Leaver* reversed. Which is an Instrument us'd by all manner of People, for the Removing great Weights, and is a very pretty Instrument for weighing; for with one Pound you may weigh ten, twenty, or hundred, as you may see good, as by the following Draught.



Which is a thing so commonly us'd by all sorts of Traders, who buy and sell by Weight, that it needs no farther Explanation, than that A is the Center of Gravity, and from thence to A B is 20 times as long as from A to C; so that altho' D be 20 times as heavy as B, yet they hang even; for should they incline one way or t'other, B must move 20 times the space of D, as in this Figure.

Where

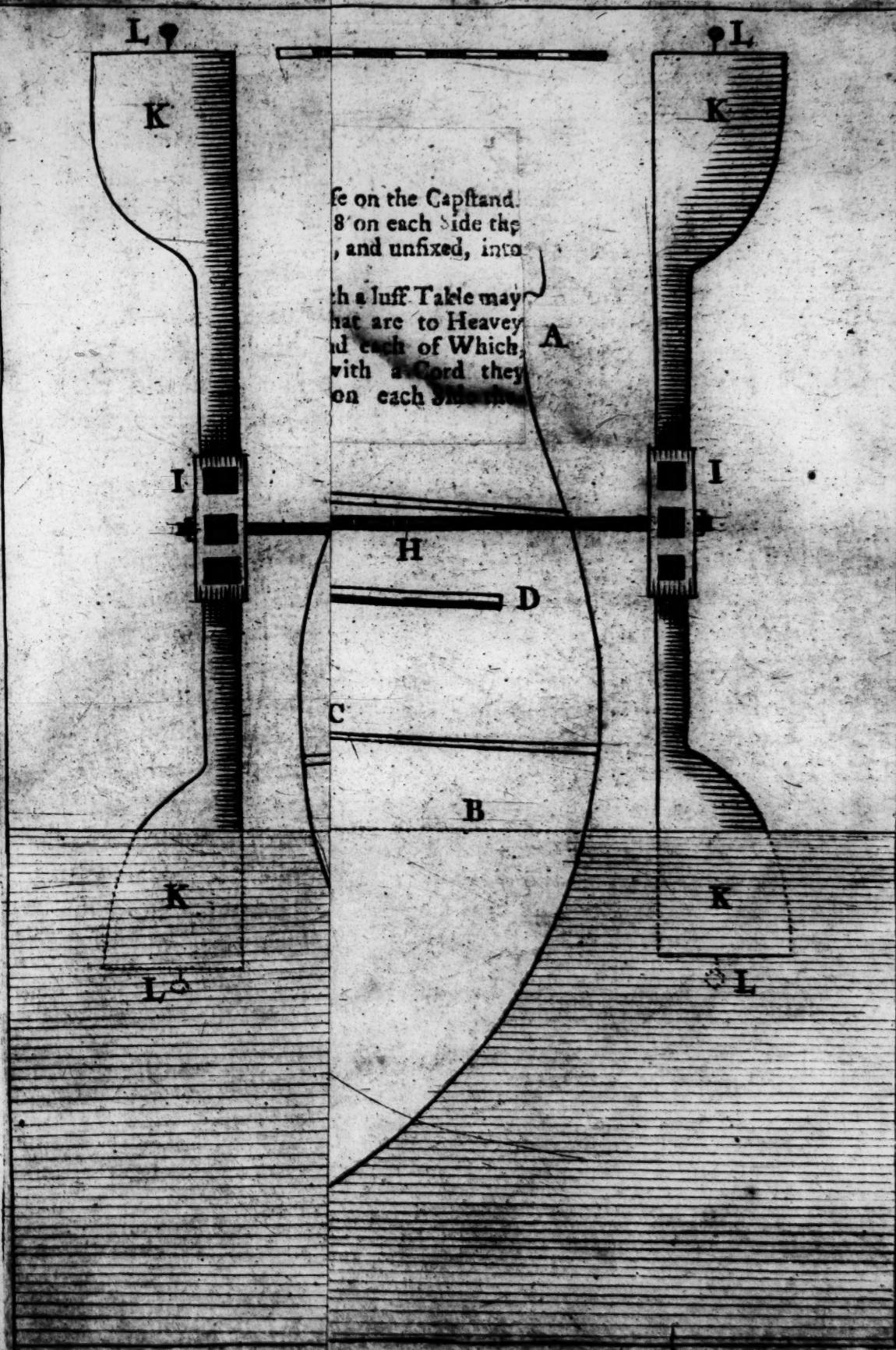


Where you find that B is removed twenty times the space of the C in the *Lever*, and in the *Oar* B is removed twice as far as C, by which means B goes twice as fast, and takes more hold of the Water than otherwise it would; and were it longer from A to B, it would still have a greater Sweep; and provided you have Force enough at C, 'twould still be more useful. But the reason why *Oars* for Ships are not made four times as long without Board as within, is that then their Bigness would make them unhandy: And you could not apply Force enough at C to work them, without some Help more than barely Mens Hands. This is plainly seen by our *Wherryes*, whose *Oars* are four times as long without Board as within; and very few are ignorant of the Swiftnes of their Motion: and I hope to prove very plainly, That the *ENGINE* I have contriv'd is exactly the Proportion of *Wherry's Oars*, both in Force, and Swiftnes, and more useful than *Oars* of that Proportion, were they practicable, and could be apply'd to a *Ship*. For every body that ever saw Rowing, knows that there is as much time and labour spent in taking their Stroak with an *Oar*,
 B 2 which

which is no help to the *Vessel's* Motion, as in making that Stroak, which is the Occasion of the Motion; whereas the Work of this *Engine* is one continued Stroak, with the same Purchase or Power in the Water, as *Oars* have, that are four times the Length without Boards as within; so that of Course the Motion of the *Ship* (moved by this *Engine*) must, with the same number of Men, be much swifter than with *Oars*; and, I hope to prove, near twice as swift, when Under-way: But first it will be convenient to give you a Draught of the *Engine*.

Now the *Bars* in the *Capstand* moving one foot, the *Paddles* move four, which is exact in Proportion to the *Oars* of *Wherryes*; for as much as the *Blade* of such an *Oar* moves four foot for the *Oar's* moving one: and one pound weight on the *Blade* shall weigh four on the *Loom*. So that one pound on the End of the *Paddles*, will weigh four on the *Capstand Bars*, and no more: and a Man at D, stepping three foot, makes L go twelve; as does a Man at the *Loom* of a *Wherry's Oar*, moving three foot, makes the *Blade* go twelve. So that all you have to do, is to make *Paddles* proportionably large to the number of Men you can bring to work at your *Capstand*, so as the Men do not tire themselves by working too fast, or too slow.

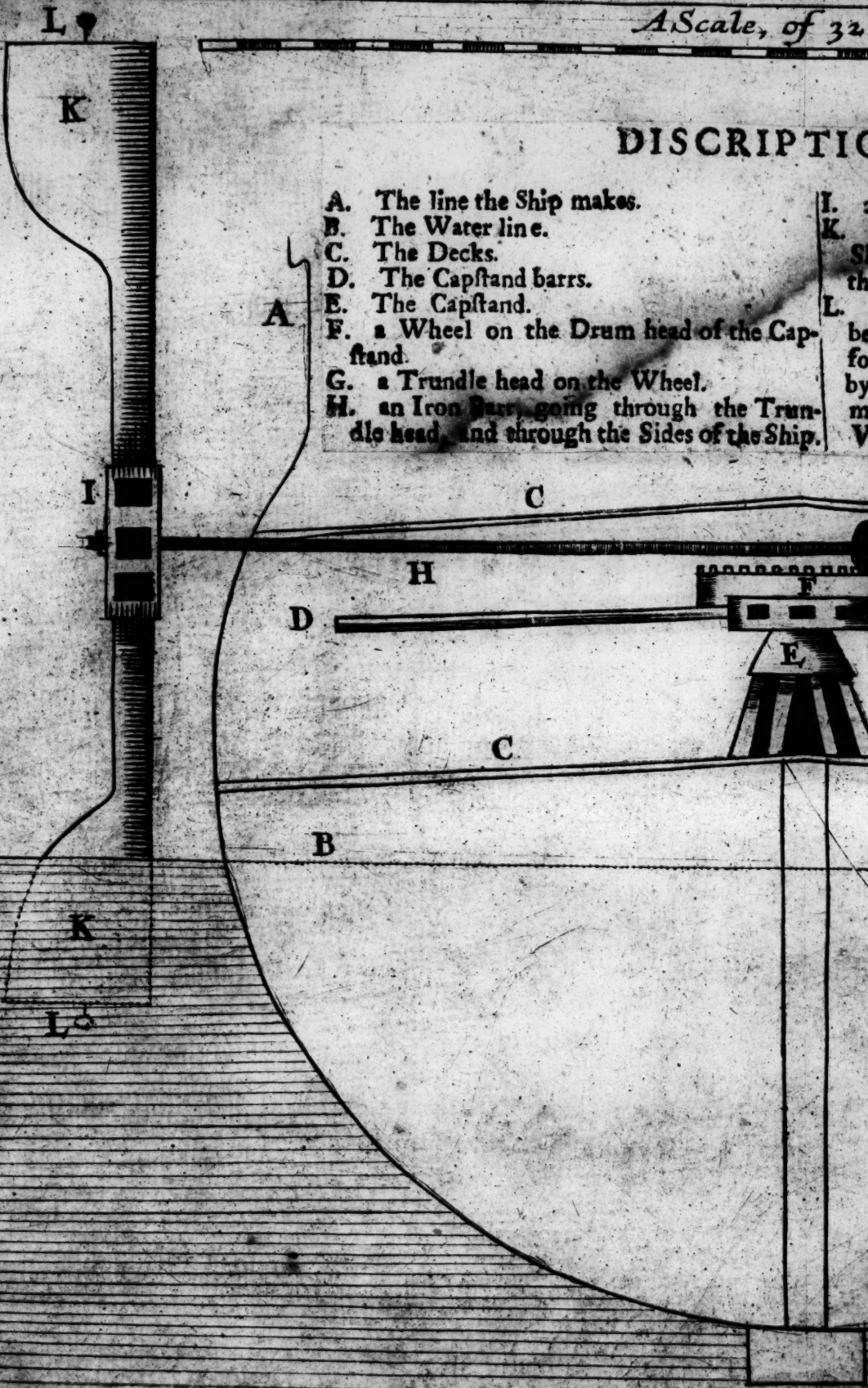
Now suppose thirty Men at work with *Wherry's Oars*, each Stroak being three foot long within Board, and twelve without: I hope one Step of thirty Men at our *Capstand Bars*, must need do the same



DISCRIPTION

- A. The line the Ship makes.
- B. The Water line.
- C. The Decks.
- D. The Capstand barrs.
- E. The Capstand.
- F. a Wheel on the Drum head of the Capstand.
- G. a Trundle head on the Wheel.
- H. an Iron Barr, going through the Trundle head, and through the Sides of the Ship.

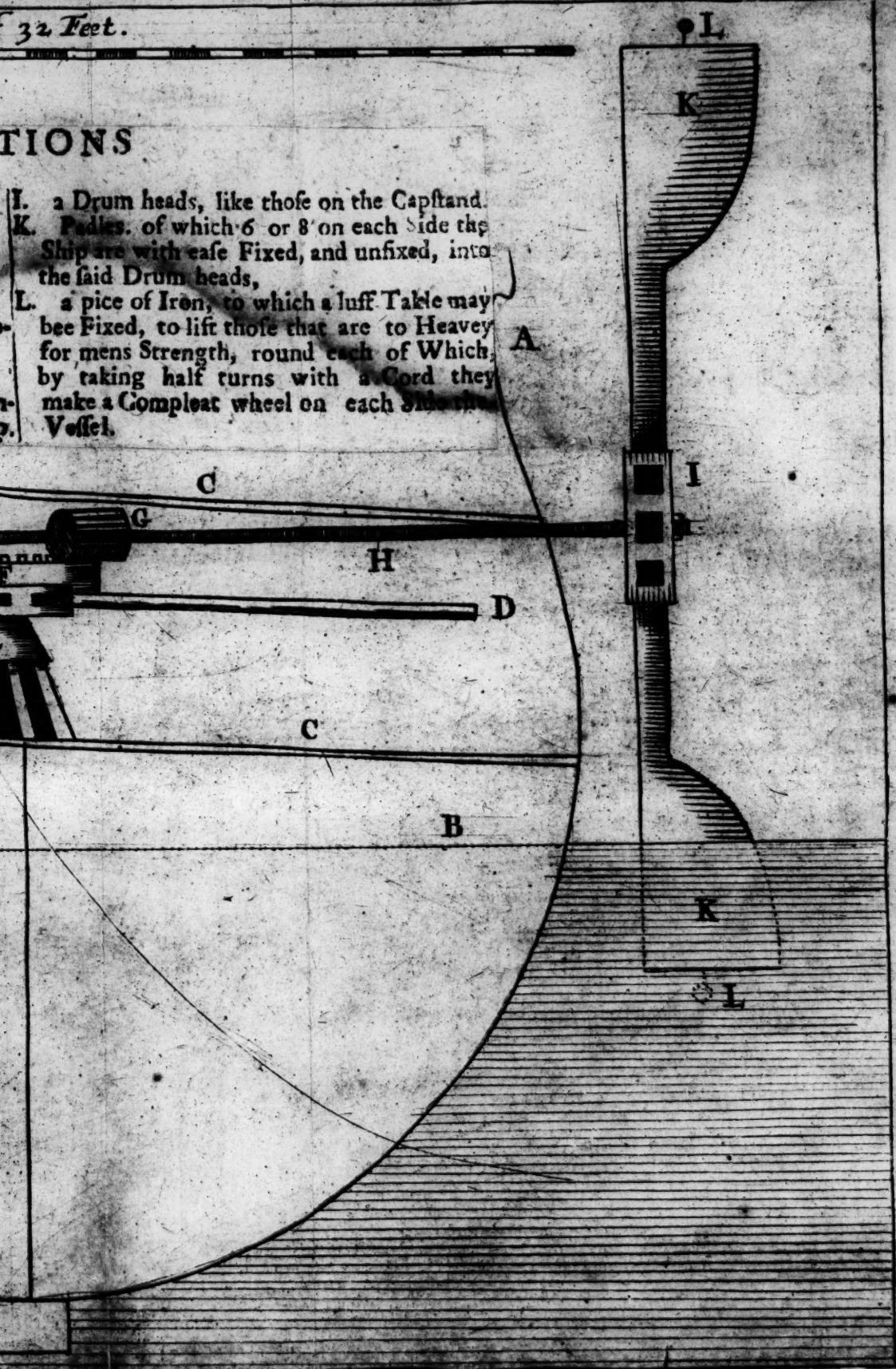
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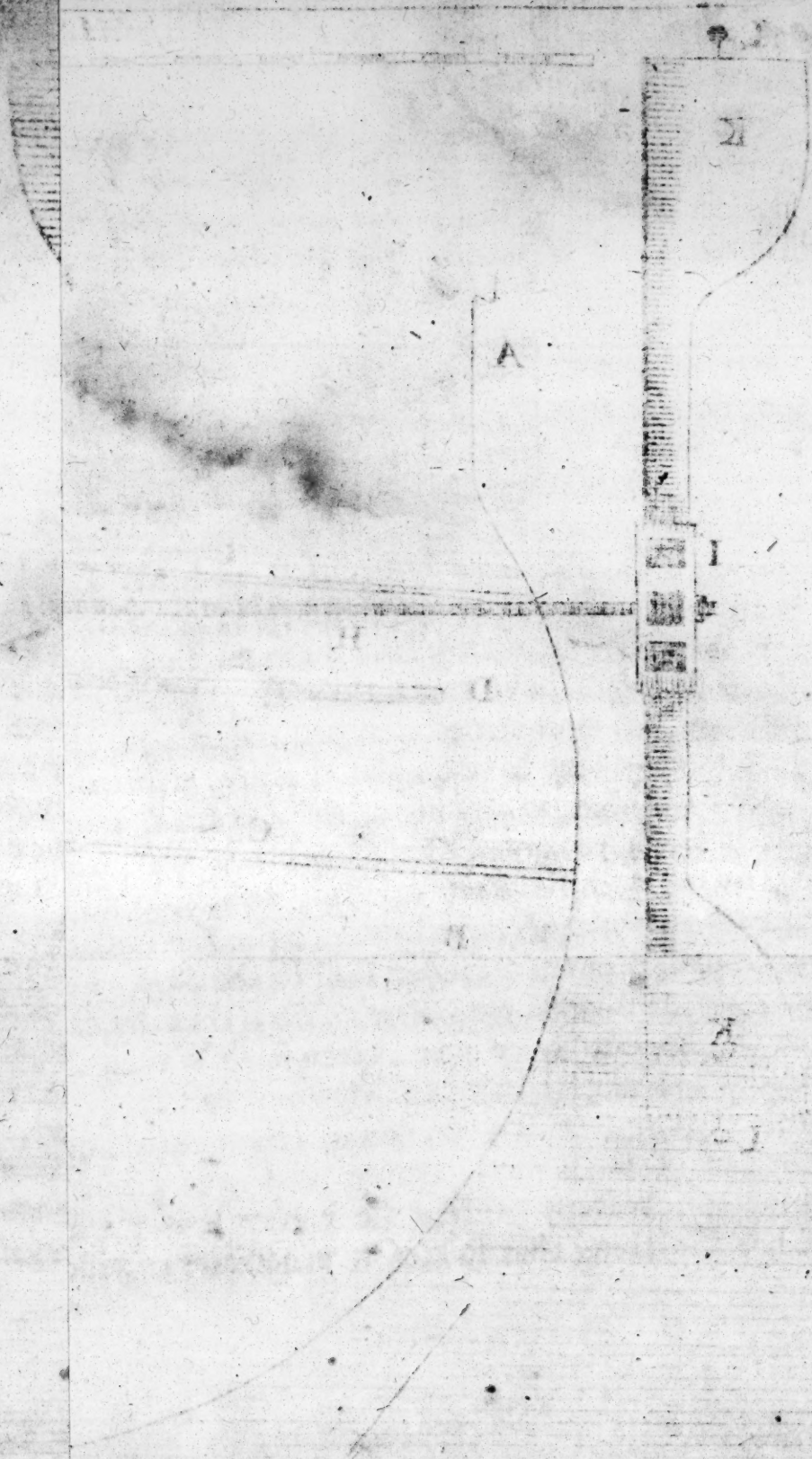


32 Feet.

TIONS

- I. a Drum heads, like those on the Capstand.
- K. Paddles. of which 6 or 8 on each Side the Ship are with ease Fixed, and unfixed, into the said Drum heads,
- L. a pice of Iron, to which a luff Table may bee Fixed, to lift those that are to Heave for mens Strength, round each of Which, by taking half turns with a Cord they make a Compleat wheel on each Side the Vessel.





same thing; and while they recover their *Oars*, thirty Men at the *Bars* make another Step with the same success; whereas the *Oars* in the mean time, do nothing but what rather hinders than farther the motion of the *Ship*, *Gally*, &c. I mean recovering the *Stroak*. So that I think it is very plain, That we have two *Stroaks* to one, with the same Purchase, Strength, Force, and Swiftnes; by which the *Ship* or *Gally*, must of consequence make much fresher way, than by any *Oars*, or any thing else, but sails, and a Gale of Wind that can be us'd. And it is common by *Long-Boats*, &c. to Tow *Ships*, even of the greatest Burthen: Now the Gentlemen that were on the *Brest* Expedition with My Lord *Carmarthen*, must know how useful this *Engine* would have been: for had they had them on Board each *Ship*, they might have row'd themselves where they had pleas'd; and if occasion had requir'd it, they might in each *Ship* have employ'd above a hundred and twenty Men, in rowing at the *Capstand*, which must needs have given the *Ships* better way, than by Towing with six *Boats* a Head, which do all by Jerks: for when the *Hanser*, by which the *Tow* is made, is extended, it gives a sudden Pull to the *Ship*, which not only deadens the *Boat's* Way, but by that time the *Boat* or *Boats* have gotten fresh Way again, the *Ship* has almost lost her Motion, and so gives another Tug, which common Experience shows to be but of small use in Water, and next a kin to a Blow on Water; which the harder it is struck, the less the thing that strikes it penetrates; which
is

is plainly seen by a *Cannon Ball*, which being easily let fall into the Water, sinks; but being shot into it with great Violence, rebounds as from a Mountain of *Brass*: By which it is plain, That a solid, steady Motion, and such as shall give the Particles of the Water time to shift places, and make room for what is to pass through it, is the only agreeable Motion to Water; and in this we excel *Oars* in *Boats* very much, for their very Work goes by Ticks: Nay, in short, even *Sailing* it self is not so steady a Motion, as that which is made by this *Engine*, except it be in a very steady Gale indeed: But the impelling Force of a Gale of Wind, being generally so far superior to Mens Strength, I dare make no Comparifon; but only where the impelling Force by Men, and that by a very easy Gale is equal; tho' this *Engine* would be a great Help to a small *Breeze*, and will in *Still Weather* force a *Ship* either backward, or forward at pleasure, without Towing the *Ship*, Steering as well one way, as the other; which is of great use to get out of a *Harbour*, narrow *Channel*, or *River*: so that the usefulness of this *Engine* for *Packet-Boats*, *Bomb-Vessels*, by Night or Day, or such other *Ships*. as it is applicable to, seems very considerable; which made me get a Friend to give Mr. Secretary *Trenchard* an Account of it, which he desir'd in Writing, and I gave him as follows.

*A short Account of the Use of the
Engine, given to Secretary Trenchard.*

THE *Engine* is so contriv'd, that being fix'd to any *Ship*, *Boat*, or *Bark*, &c. in a *Calm*, it will occasion the *Ship* to make fresher way than *Oars*, and near as fast, as an ordinary *Gale*, when all the *Sails* can be us'd, which will be very useful to the *Royal Navy*. For,

First, The Charge is but small.

Secondly, It does not lie in the *Sailer's* way in any sort of *Business*, either in handing their *Sails*, *Guns*, or otherwise; but takes up much less room than *Oars*, and is easily stowed so, as no way to incommode the *Vessel* in a *Storm*, or the like.

Thirdly, The work of this *Engine*, is as Natural to the *Sailers*, as any other part of their *Business*.

Fourthly, Whereas *Oars* take up that space on each side the *Vessel*, that they require some twenty, thirty or forty foot of each side, to pass between other *Ships*; now this doth not take up above two, three, or four foot of a side.

Fifthly, This *Engine* must be very useful in *Yachts*, *Bomb-Boats*, *Sloops*, &c. and of extraordinary use in *Fights*, to tow off disabled *Ships*.

Sixthly,

Sixthly, It is so contriv'd, that nothing but a Chance Shot can prejudice it; the Rolling of a common Sea not being able to annoy it.

A few Days after, the Secretary told me, that the *King* had seen my *Proposals*, and that I need not fear, for that the *King* had promis'd me a very considerable Reward; and that I must go to the Lords of the *Admiralty*, to put it in Practice: But that first I must make a *Model* of it in a *Wherry*; which I did, and found it to answer my Expectations. Then I shew'd a Draught of it to the Lords of the *Admiralty*, who all seem'd to like it; and one amongst them was pleas'd to say, That it was the best *Proposal* of its kind he ever saw: So I was referred from them to the *Commissioners* of the *Navy*, who all seem'd to like it; but told me, that the *Model* must be survey'd by Mr. D. . . . the *Surveyor* of the *Navy*; whose Opinion I ask'd, but he was very reserv'd, and said, That a *Wherry* was too small a thing to shew it in, there being no working at a *Capstand* in a *Wherry*; but he told me, it was a thing of Moment, and requir'd some time to consider on: For should I, said he, give a rash Judgment against it, I should injure you; or for it, the charge of putting it in Practice must prove a loss to the *King*, and indanger my Employ; but if you will (says he) give me a Draught of the several sizes of the *Engine*, I will give you a Draught of the half breadths of the several Rates, to proportion them by.

The

The Week following, one Mr. *Fuser* Under-Surveyor of the *Navy*, came to me from him, with Draughts of the several half Breadths, which I immediately returned with Draughts of the size of each *Engine*: after which Mr. D . . . would never discourage me, or let me know one word of his Opinion; but four Months afterwards sent a Report of it to the Lords of the *Admiralty*, which I was prepared to answer as follow, but was refus'd by their Lordships.

Mr. D . . . 's Objections answered; which I desire the Reader to take particular Notice of.

Object. the first. *That it is the same sort of Engine that was used in the year 1682. at Chatham, for the Towing of Ships, the charge of which proved a loss to the Crown.*

Ans. I have heard that an *Engine* with two Wheels in the Water, on each side the *Vessel*, was used for the Towing of *Ships*: But to shew, with Submission, that every Like is not the Same, I humbly beg Your Lordships to consider, That this *Engine* was not to be taken in Pieces on all occasions, as Mine is; neither was the *Capstand*, or what was used, as I would the *Capstand* of a Ship, fit for any other use. Whereas by my Contrivance, the *Capstand* loses no part of its other Qualities; and I am inform'd by very Ingenious Men, That this differs from that in all its Parts.

C

Object.

Object. the second. *I am said to overlook former Experiments, and not to give one solid Argument.*

Ans. I don't see how it was possible for me to offer a solid Argument to Mr. D . . . who never would hear me, tho' I desired him for near four Months, that I might know what he had to object: Or if he met with any Difficulties, I did not question but to make them easy; which he still denied me, telling me, That he was throughly Master of the Thing.

Object. the third. *That I assert it useful for Ships from two to twenty two foot Draught of Water; whereas the Tow Vessel in 82, drew but four and a half Water the Outside.*

Ans. It is true: But I never said, That it was as easy to force a *Ship* of twenty two foot Draught of Water, through the Water, as one of two. But I know very well, that if two foot can by a small force be moved through the Water, that twenty two may with a proportionable Strength be also moved; but if you cannot bring so great a Strength proportionable to a *Ship's Capstand* of twenty two foot, the Motion will be only so much the slower. And tho' the *Tow Vessel* in 82, drew but four foot and a half Water, they towed the greatest *Ships* by the help of four, six or eight Horses. Be pleas'd to note, That an ordinary Horse is not found to have the Strength of six common Sailers; so that fourty six Men will
do

[11]
do the work of eight Horses, whereas I can bring a hundred forty six Men to work on this *Engine*, which is not to Tow by Jerks, but move the *Ship* with a steddy and strong Motion, more agreeing to that *Element*, than any other Motion whatsoever.

Object. the fourth. *The Work by resistance is too great for Horse or Man.*

Ans. If the Objection be true, it is the first thing of its kind that could not be wrought by Man or Horse, and I believe no man of Experience will be of Mr. D . . . 's Mind in this Matter.

Object. the fifth. *That I have not consider'd the Moving equal Bodies gradatim, from two to twenty two foot, besides accidents in Elements, which I should have consider'd by proper Calculations, and not light and frivolous Instances.*

Ans. This in my Second Answer is sufficiently spoken of; and I hope the Judicious Reader is satisfy'd to the contrary of this Objection.

Object. the sixth. *Every Body that hath gravity is not to be remov'd locally, but by like Body, which is superior in weight, or by some Body, with addition of purchase artificially plac'd, as Leaver, Pullies, Capstand, &c. answerable to the Body to be remov'd.*

Ans. How two Bodies alike in gravity, can be

one heavier than the other, I am a stranger, and should I have said----- but to what is said of Purchase artificially placed, as *Leaver, Pulley, Capstand, &c.* answerable to the Body to be removed, I am ready by *Mathematical Demonstration* to, to justify this *Engine* to be no more than *Leaver*, and as much also artificially placed, with full Power and Purchase.

Object. the seventh. Whereas the Superincombency of Water is always equal in weight to the Body subsiding in it: for nothing lighter will sink, nor heavier swim, but being equal, subsides by a just decision of Nature: This weight in the whole Body of a Ship whatever it be, is to be removed; but its real and abstracted weight, I confess is much abated in communion with that Element, and may make the true weight, which must lye on the Purchase or Force of such like Engine, somewhat difficult to be punctually known; but in the room thereof, we may venture to say, That the weight of Air gently filling all the Sails, and making the Body move a space a little more than is just perceivable, is superior, and not to be removed by this Engine, occupied by all Men sailing in the said Ship.

Answ. That the superincombency of Water is equal in weight to the Body subsiding in it, is undeniable, and of use to be known, for the sinking of mighty hollow Bodies in the Water: Or by large hollow Bodies to bouge up any thing sunk; for if you know their weight, you may the better by this means

means proportion your Work. But I cannot perceive what relation this has to *Rowing*. I have seen one Horse pull an hundred Tuns through the Water, the length of three Miles, in an hour. But by the Art of Man this Horse could not have made the *Ship* sink, or rise three foot in the time: Now 'tis said, That this Weight, what ever it be, must be removed; which a Man's Hand will do in a wet Dock, by the largest *Ship* that ever was built, provided the Water in the Dock, nor the Air above it have no perceivable Motion, and the *Hausers* loose enough to give the *Ship* leave to move; and this Motion shall be perceivable, tho' I own very slow. But 146 Men having 146 times the Strength, will make the Motion increase to a far greater Swiftnes, having continued Purchase, which all Wheels of this *Engine* have. But it is affirmed positively, That if there is as much Wind as will but just occasion a perceivable Motion in the *Ship*, it will be too strong for all the Men in the *Ship* to resist. Now certainly a *Ship* in still Water has been found, by all that have made their Remarks, to be as inclinable to go a Head as a Stern, and that the strength of one Man (as I said before) can occasion it either way; and I think it absolutely impossible, that a Ships Crew of as many Men as are but in the smallest Rates, should not have more strength than one man. I am satisfied, that none but mad-men ever attempted to Row against the Wind with all their Sails spread, if there were a possibility of furling them. And tho' it be difficult to know exactly what way a Vessel will

will make in a Tydes way, yet a little experience will teach us, that without all doubt, as exactly as Sailing, or the present way of Rowing a Barge, or the like.

Object. the eighth. Nevertheless, when Abatements shall be made for infinite Accidents by Winds, Tydes, Roughness of the Sea, Misunderstandings in the Working part, Unevenness and Uncertainty of Mens Strenth, Dislocation, Frictions, and other unfortunate Incumbrances; such Clock-work under the weight of Ships in the Sea, will ever be lyable to: This Proposition, in our Opinion, can never, by any known Sailor, or other intelligent Man, be thought practicable at Sea.

Ans. In Winds and Rough Seas there is no occasion for this ENGINE, for the Sails will occasion motion enough. Misunderstanding in the VVorking Part may happen, if a Horse in a Mill can go out this way, but not else. Unevenness and uncertainty in Men's Strength, may as well obstruct all the work the Sailers have to do. Dislocations, &c. my Work-man shall prevent, or have nothing for his Labour. And I never offer'd that this Mill-work (which is call'd Clock-work) should support the weight of Ships in the Sea. For since I began this Design, I have shewn the Draught to several Sailers, as well as other Intelligent Gentlemen, which I am sure in number are above two hundred, but

but have not met with any one that could make any reasonable Objection, but what I soon gave them full Satisfaction about. Now I humbly offer, That if my Affirmatives can be esteem'd in ballance with these Contradictions; That this *ENGINE* may be put in Practice but on one Ship, the charge of which will not exceed 70 *l.* the hazard of which sum is very inconsiderable, weigh'd against the Advantage this *Engine* may be to the *KING's* Service.

When I found the Lords of the *Admiralty* so much altered, that from commending the Thing, they would not hear one word in its defence; I made bold to ask the Opinion of the greatest *Engineer* in the *Christian* World, viz. Sir *Martin Beckman*, who told me, That the thing was good, and would answer my Proposal; and withall said, that His *Majesty* understood those things as well as any *Engineer* in the World. Upon which I made my humble Request to a most Noble Lord, who shew'd a Draught of it to the *King*; who being at that time very busy, ordered me again to the *Almiralty*, who never ordered me in before them, but after waiting 2 or 3 Days, the Door-keeper told me, that my Business lay before the *Navy*. Upon which, the next Day I desired a Friend of mine to go with me to the *Navy Office*; that he being a Man of Extraordinary Judgment, and no less Reputation, might be an Evidence of what Discourse might happen: But coming to the *Navy Office*, we found the *Board* was rose. However, in the Hall I found Mr. D I as'd him

him, Whether any thing was come before the Board concerning my Business? *No*, said he, *not since the Objections sent to the Lords of the Admiralty*; on which, he could not but fall into an Argument.

I asked him some Questions in relation to his Objections; and in a very little time, we had a great puther about superambient Air and Water. I found that my Sailer run himself fast aground, as Men commonly do when out of their Knowledge. This indeed made me pity him again, altho' I was willing to come to the plain truth of the matter; and asked him, Whether or no he could not bring 150 Men to work at this ENGINE? He answered, *Yes*. Then said I, Will they not have as much power to give a Ship motion, as 150 Men would have on Shore at a *Hawser*, fastened to the Ship? This he likewise answered in the affirmative: Then said I, it will do more than Oars, or any thing but a Gale of Wind, and fully answer my Proposals. Well, said he, with a Smile, and putting off his Hat, as taking leave, we are all Submission to the Lords of the Admiralty; and so went off. Not long after, a Friend of mine met a Commissioner of the Navy; and my Friend being perfectly acquainted with my Contrivance, asked the Commissioner, Why it was not put in use by them? The Gentleman offered several Objections; which were by sound reason, so fully answered by my Friend, that he had only this hole to creep out at: *Sir*, said he, *have we not a parcel of Ingenious Gentlemen at the Board?* *Yes*,
said

said my Friend, I hope so, or 500 l. per Annum is paid them to a fine purpose. Is not Mr. D (says the Commissioner) one of them, and an ingenious Man? I hope so, continued my Friend. Then, said he, What have interloping People, that have no concern with us, to do, to pretend, to contrive or invent things for us?

So Reader, here you may see what to trust to, tho' you have found out an Improvement as great to Shipping, as turning to Windward or the Compass; unless you can sit round the Green-Table in *Crutched-Friars*, your Invention is damned of course: and yet some of these People did own to me in private, That it was pity this ENGINE was not put in practice, for that it would be of singular use; but I find, there are a sort of People in the World, that will rather disserve King and Country, than disoblige, or run counter to one another, in things of great and small importance. I know not how Mr. D will clear his Objections, and make them appear truth to the World; tho' I am satisfied, that he will not want for those that will assist him, tho' never so contrary to reason; and at present, I think it behoves them so to do, or honestly to recant. I hope none that read this, but will find Mr. Ds Arguments very weak to obstruct for so many Years together, a thing of that Use and Service to the Nation, that this would have been; and truly, unless Mr. D do publish better Reasons than he has yet done, I shall think, and question

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not,

not, but some hundreds more will be of my opinion, that had he lived in the time that the Compass was found out, if he could not have laid Claim to that unparrallel Discovery, he would have obstructed its use to the utmost of his power.

The last year I made sufficient demonstration of the use of my ENGINE on the *THAMES*, of which thousands were Eye-witnesses, and all People seem'd to like it; the Publick News Papers speaking very largely of it, yet all to no purpose. I can bring Men of undoubted Reputation, to justifie, that with a small Yacht that I fix'd it to, I once below Bridge made better way; or out went a Ketch in a Gale of Wind, who had all her Sails spread, *viz.* Main Sail, Main Top-Sail, Main Top-Gallant Sail, Fore-Sail, Gib-Stay Sails, and Mizzen; and we had the help of nothing but eight Sailors working at this ENGINE, and yet the Vessel I used this ENGINE in, was far more improper for it than any Vessel in the King's Service; and would my circumstances have afforded it, I would have fitted out a large Vessel my self, it being chiefly proper for such; but I thought that ocular Demonstration would do, tho' in never so small a Model, which made me begin with a Wherry; and by that time I had solicited up and down, and made an ENGINE fit for a Yacht, I found the Expence too great for me, and was forced to desist: for altho' the ENGINE did not cost much, yet the continual charge of going with the Yacht, was considerable; insomuch, that
that

that my endeavour to serve my Country, has cost me above 200 pounds. Yet the charge of this ENGINE in such a Vessel as the Royal Transport, will not exceed 50 pound; and tho' I have a Patent for it, yet the first Captain of a Frigate that desires it, I will assist in the making of it, aboard his Ship *gratis*; and that he may be certain, that I won't impose upon him, he shall have liberty to use his own Workmen: but this I will only do by the first comer, and I doubt not, but when the Ice is once broke, I shall at least receive thanks for my past Labour and Expence.

I have, besides the ENGINE before-mentioned, made several useful Discoveries; of which I will give some account, it not being altogether out of its place; which is a method whereby I will fight any Ship, using Charge and Discharge as often as six or eight do now, and to as much purpose, without any manner of incommodation more than by the common way: so that one half of the Men need not be exposed that now are, and the rest may be kept as a reserve for Boarding, &c. the benefit of this I leave to the ingenious Sailor; besides which, I have invented a Gin of 14 inches square, portable by one Man, by which one Man may lift the largest Cannon or Mortar into her Carriage. But I will never discover one title of either of these, till I find justice done me on account of my Rowing ENGINE, I mean that it is put in Practice, and I am Rewarded; or else, that it is proved useless by an Argument, or Experiment; not by such Objections as Mr. D. . . .

[20]
who talks of the weight of Ships in the Sea lying on this Clockwork ; by which I believe, neither he himself, nor any one else, knows what he means: for this ENGINE is not to be under Ships in the Sea, nor to lift Ships out of the Water, but to occasion Motion ; which, as I shewed before, that even the smallest Force will do ; and the greater the Force is, the better or swifter the Motion will be: but to avoid trouble to any, who shall think fit to write against it, I shall give an account of some other Objections that have been raised against it, which I have met with.

Object. the First. *It is lyable to be shot.*

Object. the Second. *It will lye in the way.*

Object. the Third. *That the Wheel and Trundle may be out of order, and is not to be mended by a Ship Carpenter.*

Ans. the First. A Captain may be shot, and a good and brave Man's Life lost, will you not therefore have good Captains? A Yard by a Shot, sometimes from the Top-mast Head, descends to the mens Heads on the Deck, will you therefore have no Sails? But this ENGINE is the least lyable to be injured by a Shot of any thing: for tho' it break some of the Paddles, you suffer no inconvenience, as I have tryed by taking some out. Should a Shot take all the Paddles off of one side, the Vessel will
make

make near as good a way as before, and steer nigh as well : and truly I think, it must be a very odd Shot that can totally disable this *ENGINE*, so as a small time will not repair it. And I think the Rudder in ten times more danger ; yet a man would deservedly be thought mad, that would have no Rudder to a Ship. But, suppose at any time, that this *ENGINE* is disabled, the Ship is still in as good order as any Ship now is, if she has no other harm ; and it will be ill luck indeed, if there are three or four Ships together, and all are disabled at the same time.

Answ. the Second. For its being in the Way, I know of nothing about it that can be thought to be so, but the Bar, or the Paddles for the Bar. Now I desire the Sailors to stoop a little when they go under it, and when they do not use the Paddles, to stow them on the Boom under the Long-Boat, their Shape making them very proper for that place.

Answ. the Third. For a Shipwright's not understanding, or not being able to mend the Wheel and Trundle, it is next to impossible ; for without Flat-tery, the men of that Profession, of all the Brothers of the Broad-Ax, are the most general Workmen ; and it is hard to find a Shipwright, but either is, or with little trouble will be, on occasion, House-Carpenter, Joyner, Wheel-wright, Mill-wright, Cooper, or what you please of that kind.

All

All that I have now to add, is, That whoever is angry with Truth, for appearing in mean Language, may as well be angry with a wise and honest man for his plain Habit : for indeed, it is as common for Lyes and Nonsense to be disguised by a jingle of VVords, as for a Block-head to be hid by abundance of Peruke.

I have had my Patent for this *Engine*, about Two years, and am sorry it was not put in practice in time of VVar, because of the use it might have been of Aboard His Majesties Navy ; however, Men of sense will see, it may be put in practice with good Advantage in time of Peace ; and I hope, its Novelty will not hinder an Experiment of it.

*Wherefore, fly no Invention, 'cause 'tis New,
But strictly search ; and after careful View
Reject if false, embrace it if 'tis True.*

Creech's Lucretius.

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